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ABSTRACT

This paper, from the Workshop Center for Open Education, deals with the problems of recognizing and dealing effectively with reading difficulties. The introductory sections explain the problems of identifying the poor reader and define the concept of reading. The next section investigates the following biases that are prevalent in reading tests: language dialect, class bias, conformity bias, early reading bias, speed bias, emotional bias, and teacher strategy bias. Following this section, the paper discusses the inequalities in the scoring system of standardized reading tests. Some alternatives that the paper recommends are a) a more individualized assessment of reading difficulties, b) a more limited and careful use of reading tests, and c) an understanding of the reader's motivation. Twenty-six references and a 13-item bibliography are included. (BRB)

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# Reading failure and the tests

by Deborah Meier

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# I. The Problem

In a society in which a decent livelihood and effective political participation are increasingly dependent upon education, the poor (who include a disproportionate number of nonwhites) are not receiving a minimally adequate education. The most obvious symptom of such inadequacy is the large percentage of the poor who never become competent readers.

Given this incontestable fact, it is unfortunate that public focus has centered largely on the gap in scores on standardized tests that exists between blacks and Puerto Ricans on one hand and middle class whites on the other. For one thing, it tends to draw attention away from the fact that poor whites have had a similar history of difficulty, while middle class blacks and Puerto Ricans generally do become competent readers; this fuzzing on facts has led to a good deal of implicit and explicit theorizing regarding the cognitive inadequacies of blacks and Puerto Ricans. Secondly, because of the importance attached to test scores, almost all school programs have set as their goal a reversal of the scoring pattern (so that blacks and Puerto Ricans would more frequently appear on the upper half of the scores), rather than the more important task of achieving reading competence for all. In using grade level norms or percentiles as our measure of success, our schools sanction a system in which half of all American children are forever doomed to be labeled as failures, a system that places its emphasis on that which is least critical, rather than on that which is most, on that which is least subject to change, rather than on that which is most.

To the layman, being "above grade level norm" appears to be the same as being a competent reader. But, in fact, this is not necessarily so.

Any measurement device which reports results only in comparative terms (as percentiles, or months above, or below, average) will reflect the total

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environment of its subjects and not merely their specific competencies. Given, on one hand, the life-style of middle and upper-middle class children, the advantages that accrue to them from having well-educated parents with money, leisure time, school system know-how and good connections, not to mention better health facilities and greater stability, and on the other, the disadvantages accruing to children with parents who possess few such resources, who are generally without the time and leisure to seek supportive services, or the money to pay for them, or the personal connections that provide an "in," and so on, and who are more likely to suffer from multiple social problems, it would be surprising if the former did not, at a given age and after a specific amount of schooling, appear more frequently at the higher end of the scale.

One need merely call to mind specific case histories of relatively well-off friends, whose children needed and received extensive private remedial help or aid with severe physical or emotional disabilities over many years before they overcame specific handicaps. One must call to mind also the enormous advantage of knowing that one's life circumstances are such that one flaw need not be fatal, that effort over time can wipe out a late start. This kind of assurance, so critically important to the self-confidence of the slower learning or handicapped child, is hard to come by in parents whose life experiences have taught them that society will not provide a second chance.

Under these circumstances -- and with the device used to measure ability and predict future success weighted toward the particular competencies, style, and experience of the already more advantaged group -- one realizes how hopeless is the effort to equalize testing scores.

We need not settle for such a situation, however, if educational competence is our goal. Without denying the existence of real handicaps,<sup>1</sup> it is critical to look also at the "cumulative effect of some teachers' language strategies, which exacerbate"<sup>2</sup> the existing deficits. How else explain the fact that social class differences "in certain receptive language skills are considerably more apparent at fifth grade...than first"?<sup>3</sup> By "teachers' strategies," I refer here not merely to individual teacher bias or poor technique, but to the basic educational strategies of our school system which include its methods

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of evaluating and testing.

In short, a disadvantage is a disadvantage, no more. To be handicapped in certain respects is a complication, but need not be a fatal disease. To overcome a handicap in any specific learning task, a learner requires two "special" things (assuming he is not in a position to impose an equal handicap upon his advantaged competitors): He needs time *and* he needs the determination to use time effectively. Yet we design schools in such a way that a learner cannot utilize time and in which little consideration is given to the factors that might provide a learner with sufficient drive to effectively compensate for his disabilities. In fact, the opposite is the case. The school system classifies children handicapped in some way as inadequate even before they can begin to use their time; it wastes what precious time they have in exercises in futility; and it deprives them of hope and enthusiasm by focusing on their weaknesses rather than utilizing the strengths that they have exhibited prior to entering the school system. The school system tries to get children to unlearn first what they have successfully mastered already, and then purposely ignores the drives and interests that motivate them as children in a fruitless effort to impose something known as "the curriculum."

Normally, when a person is so disrespected he can walk away from the situation. But a child *needs* the help of schools. He needs an environment that will utilize whatever is known about learning on the one hand, and his specific strengths, weaknesses, and unique individuality on the other. That is the problem with which we need to deal.



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## II. A Definition Of Reading

"The process of learning to read in one's native language," contends noted linguist Charles Fries.<sup>4</sup> "is the process of transfer from the auditory signs for language signals, which the child has already learned, to the new visual signs for the same signals.... Learning to read... means developing a considerable range of habitual responses to a specific set of patterns of graphic shape."

While commonsense tells us that a "good reader" must also have understanding, thinking, imagining, judging, evaluating, analyzing, and reasoning ability, not to mention a good deal of knowledge about the world, these are matters of general linguistic and intellectual development, as well as maturity, that have been achieved by people who could not read at all! They are essential tasks for schools; they are critical to a good education. They can and must go on *side by side* with "learning to read" as defined above. But it will be useful for us to keep these somewhat different aspects of reading in mind as we proceed.

Children learn to be fluent talkers by four or five years of age -- but no one would deny that an enormous road still lies ahead in order to arrive at effective adult language competence. The task in reading is similar. After a child has learned to read, in Friesian terms, he still has a long way to go to achieve reading competency, which includes all the factors relating to general linguistic and intellectual development. Our standards of competency, moreover, are determined by factors that are historically and culturally determined, and which vary also according to an individual's own goals.



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## III. The Tests, Their Biases

Why does the practice of giving standardized normative group reading tests in the elementary schools make it more, rather than less, difficult to improve reading competence, particularly for the more disadvantaged pupils? Why does it complicate the task of even assessing the nature or extent of the difficulty?

The following seven factors are by no means exhaustive, and they often intertwine, but they do set the parameters of the problem. I shall list them here *briefly*, and then examine each more carefully.

1. Such tests are, by their very nature, biased in favor of children whose home and neighborhood use Standard English, and who are thus familiar and comfortable with this particular pronunciation, vocabulary, and syntax.
2. They are biased in favor of children who have had a specific type of middle class experience with life -- in terms of vocabulary, style of speech, knowledge of life, associations, and values.
3. They are biased in favor of children with fairly conventional, conforming, and uncreative thinking patterns -- even within that middle class culture.
4. They are biased in favor of children who mature early in terms of verbal skill, and thus penalize later maturers.
5. They are biased in favor of those who think and work quickly, thus penalizing children whose thinking and working processes are more cautious or careful.
6. They are biased in favor of children who are emotionally and socially secure under competitive and judgmental pressures.
7. They are biased in favor of children who



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have been subjected to certain methods of teaching reading and certain related theories about learning to read. They thus penalize children who are learning in different ways. As a result, they tend to confirm their own biases and to lock schools into specific teaching strategies that are increasingly under question by linguists, learning theorists, teachers and parents.

The reputation such tests enjoy is based on their past validity as predictors of school success and their pseudo-scientific mumbo jumbo. Since both a child's future placement in school, as well as the attitudes of his own parents, his peers (even himself), and his teachers, are substantively affected by his test score, it is hard to know which is cause and which is effect. The fact that such *predictions* could be obtained simply by predicting children's reading success as a correlate of the income/educational level of their parents further confirms the hopes and prejudices of the most powerful and articulate section of our society who help determine school policy.

But "correlation is not causation (the *post hoc* fallacy),...A pupil can have many of the positive characteristics cited and yet be a poor reader... conversely, a pupil can have many of the disabilities cited and demonstrate adequate reading skills."<sup>5</sup> In other words, the correlation may well relate to historical and sociological factors of discrimination and poverty, and have no other intrinsic connection. In fact, as Courtney Cazden<sup>6</sup> caustically remarks, a correlation also exists between the number of cavities a child has and his educational future. Can we thus test reading by counting cavities? The point is that in treating correlation as causation we reinforce the connection.

The danger of such harmful reinforcement faces us at every step of the way as we examine the meaning and effect of the tests. It lies in the fact that false assumptions regarding cause and effect can lead us to focus on irrelevant or secondary symptoms, ignoring the really critical deficits (and strengths) of an individual child.

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#### 1. THE LANGUAGE DIALECT OF THE TEST: STANDARD ENGLISH

A tester must choose a language form for the tests -- a particular dialect. It is altogether natural

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that he should choose what is called Standard English (SE). Yet for several subgroups of American school children this means that the test forces them to handle two separate cognitive tasks, while their counterparts (and competitors) need handle only one.<sup>7</sup> Though it is certainly understandable and legitimate for parents and for society to select Standard English as the form for education, the consequences of such a decision should not be swept under the rug.

There are important differences in vocabulary, syntax, and patterning of speech among subgroups of our population that have been documented by considerable research. A test which relies on any one of these dialects -- no matter how legitimately -- is necessarily going to affect young children differentially.

"The disadvantaged Negro must not only decode the written words, he must translate them into his own language. This presents an almost insurmountable obstacle since the words often do not go together in any pattern that is familiar or meaningful to him."<sup>8</sup>

While such a statement probably exaggerates the extent to which a dialect is a "new language," Baratz is generally correct in noting that a child from a non-Standard English (non-SE) language environment is confronted in such tests with two tasks, where his SE peer confronts only one: (1) dealing with a new dialect with its own distinctive pronunciation and syntax rules; (2) learning the meaning of graphic symbols. Furthermore, Baratz is right in noting that such a child also faces the "vague, or not so vague...sense that there is something terribly wrong with his language."<sup>9</sup> I need only recall my own son's reaction of confused withdrawal in first grade upon discovering that his teacher did not like "the way" he spoke. Further investigation turned up the rather simple fact that his teacher had been "kindly" attempting to alter his Chicago accent to a New York one. When it comes to speech pattern, we become, if we are not already, sensitive to criticism or correction, even under the most favorable circumstances. Under less than favorable circumstances, it is perhaps not surprising, then, that many disadvantaged children appear nearly mute in their early years in school.<sup>10</sup>

The majority middle class child is not faced, when he comes to reading, "with the problem of learning a new language, such as the native tongue he acquired

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a year or two before. What he has to do is...far simpler -- to recognize a different symbol, for the same thing."<sup>11</sup>

These dialect differences affect a child in the testing situation in many ways. For one thing, in any phonics subtest based on SE pronunciation, a non-SE child is dealing with different sets of homonyms, rhyming words, and word endings. For example, the distinctions between PIN and PEN, CHEER and CHAIR, FOR and FOUGHT, which exist in SE, do not occur in many other dialects.<sup>12</sup> If a test attempts to distinguish precisely such words in order to assess comprehension of phonics it has selected words biased in favor of children whose native dialect makes such distinctions. It would be as though an SE child were asked to distinguish SUN and SON or HERE and HEAR on a phonic basis.

Secondly, grammatical differences are tested, even if inadvertently. For example, in the California Reading Achievement battery intended for first and second graders, children are required to select the "correct" word to complete such sentences as:

I have read (*those, them*) books before.  
Beth (*come, came*) home and cried.  
We (*was, were*) told to sit down.  
I didn't hear (*no, any*) noise.  
A man (*came, come*) to the door.  
Is (*this, this here*) your pencil.  
She (*doesn't, don't*) read well.  
When (*may, can*) I come again.

In no case would the "wrong" answers lead to a failure of communication. In most cases they correspond to one or more of the rather common dialects in America (which may well be why they were chosen). A middle class child answers these correctly not because of superior intelligence, good teaching, a good ear, or knowledge of the rules of grammar, but because he has learned to have confidence in his own language -- which is the language of the test. He simply selects the one that sounds "natural" to him. But what is the six-or seven-year-old, low-income, urban black or southern Appalachian white child to do with this subtest? His sense of being "out of it" probably affects his performance elsewhere on the test. It might even affect him on those items in this same subtest in which his natural speech pattern coincides with SE. How can he tell when it does and when it does not?

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Thirdly, similar problems of word usage, grammar, and syntax will affect, to a greater or lesser extent, a child's ability to handle all of the sentence comprehension sections of the test. While written and spoken language differ in SE, and thus often give even an SE child difficulty, the relationship between the two is closer than between written SE and spoken non-SE. Certain phrases which seem natural to a middle class SE child are, in fact, colloquialisms that will appear meaningless and peculiar to a non-SE-speaking child.

The issue at stake in these distinctions is not a simple one and is certainly controversial. Are dialect differences, for example, questions of language sophistication (universal and extended versus parochial and restricted), with all that this implies regarding the superiority of SE as a language code, or are there merely *different* language codes? Regardless of the answer, what are the teaching, and therefore testing, implications?

At one time it was generally assumed that Standard English represented cognitive superiority over non-SE. But recent investigations by linguists have led to the contrary conclusion:

"There is nothing, but nothing, in the dialect as such which prevents a child from internalizing and learning to use universalistic meanings."<sup>13</sup>

"On the face of it, there is no reason why a person cannot learn to read standard English texts quite well in nonstandard pronunciation."<sup>14</sup>

"With the exception of a few features, such as the special use of *be*, the differences are all matters of surface structure and affect meaning not at all. There is therefore no reason why a BE-speaking (Black English) child cannot express any and all ideas in his dialect."<sup>15</sup>

"One cannot, in other words, characterize a language by its lexicon."<sup>16</sup>

A child speaking Black English can express any and all ideas in his own dialect, but it is also true (and this is what causes the confusion) that BE usage is, however rich in imagery, more limited in certain other more abstract logical and descriptive functions. This is not *due* to inherent inadequacies in the dialect *per se*, but because of the particular historical

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and social circumstances of the speakers of this dialect. Given other historical, geographic and economic circumstances, BE could have developed into a language with the *type* of complexities, specificities, etc., that SE now encompasses. An SE--speaking six-year old, for example, is in no way defective in his grammar, syntax, or lexicon, but he will still have a limited capacity to handle complex sentence forms, more abstract language, hypothetical questions, etc. This does *not* mean, as Piaget has demonstrated, that his six-year-old dialect is inadequate, but rather it is indicative of his concerns, his focus, his style of thought. The domination of one particular dialect over all others is determined, in any society, not by its intrinsic merits, but by the social and political weight of the group it represents.

These conclusions clearly should raise serious questions regarding the teaching of language and reading. Certainly there are important reasons -- in part social and economic -- why all children should master SE at some point in the educational process. The fact that the majority of the reading material available is in SE is further reason for emphasizing fluency in SE as an educational goal, (although of course, one can be adept at reading, and even perhaps writing, in SE and still have difficulty using it as one's primary oral language.) What is at issue, however, is not the value of learning SE, but when and how, and under what terms. For our purposes in particular, should it be undertaken before starting to read, in connection with learning to read, or afterward once reading has been established and as a separate but related language skill?

William Harmer<sup>17</sup> suggests that "during the earliest -- and probably the most difficult -- stages of learning to read, children should not be immediately compelled to cope with the additional problem of drastic alteration of their own dialects." This coincides with Fries<sup>18</sup> analysis of the act of learning to read. If learning to read is the "process of transfer from the auditory signs for language signals, which the child has already learned, to the new visual signs for the same signals" rather than the "the learning of the language code itself or of a new language code" or even of "new words or of new grammatical structures or of new meanings,"

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then it should follow that a child should be free to learn to read in his own native language code. Certainly if he is not, he will have a far more difficult time. For most children "learning to read is a matter of drawing on one's prior knowledge," a fact which the writers of basal readers have in mind, for example.

Thus, it is important to children's test success in the primary grades whether we solve the question (as Harmer, Cazden, and Fries seem to suggest) by teaching children to read in their own vernacular, making the transition at a later stage, or whether we concentrate first on getting children to be fluent in oral SE (or, as in Bereiter-based programs, an imitation of oral SE), or whether we try to teach reading in SE with content and vocabulary chosen to match the child's experience, without undue emphasis on changing the oral dialect. For example, a test in SE will be more difficult for non-SE children at any specific grade level or age, but given certain tests it will be most difficult for children following the course Harmer and Fries seem to suggest.

Placing a high priority on both learning to read, and on mastery of, SE does not solve the problem of deciding which strategies will best achieve both goals. Standardized tests in SE complicate the task of exploring these different approaches, since none is likely to yield the kind of instant test score results that are being demanded, and certain approaches will in the initial stages penalize the testee even if they may have other long-range advantages.

The impact of this language bias (as well as the test scores themselves) on the self-confidence of non-SE parents and children and on their teachers is hard to overestimate. For a child, it affects not only his attitude toward reading, but his attitude -- at least within school -- toward his own oral language, which is so critical to long-range reading and school success. It must also cause strain between child and parent that is hard to establish quantitatively.

A Headstart program, referred to by Courtney Cazden, discovered that non-SE children scored poorly on a subtest on grammatical closures which tapped knowledge of SE morphology (Illinois Test of Psycholinguistic Abilities). This led the staff to conclude



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that these three-and four-year olds were deficient in language skills. The cure: intensive SE training.<sup>19</sup> While such training is going on, what is its impact on the oral self-confidence of the children, on their vocabulary growth, their exploration -- both verbally and actively -- of their environment, and on their interaction with teachers, parents, and peers? What is its impact on teachers' assumptions about the ability and readiness of non-SE children? Isn't this type of educational conclusion, in fact, the natural result of unscientific assumptions regarding the relationship between a correlation and a cause, between the socio-economic advantages of SE and its linguistic and cognitive superiority?

The solutions are not clear cut, and the range of alternatives still broad. But it would be unfortunate if our solutions were to be foreclosed by the demands of nationwide standardized testing.

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## 2. MIDDLE CLASS BIAS OF TESTS

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Assumptions regarding appropriate subject matter, sentence structure, vocabulary, particular conventions and symbols, and values are inescapable in designing any objective standardized test.

### *re Vocabulary*

"At the period of minimum literacy, age nine to 10," says reading expert Gertrude Hildreth, "the word bank consists of some 3,000 of the words most commonly used in English. These are the words that are recognized easily in any settings."<sup>20</sup>

Yet surely the list would differ considerably depending upon the subculture of a child. Discussions with black children in the third grade at PS 144, Manhattan, clearly indicated that many of the words on the 1970 and 1971 Metropolitan Achievement Tests (MAT) were unfamiliar: *wade, brook, forest, path, side street, bonfire, disease, germs, architect, and canoe*, were among them.

On this test, a seven-year-old is not merely required to know these words functionally, but to have, in addition, very precise and special definitions. For example, "a canoe is.." can be completed by either "a kind of boat" or a "kind of ship." This quibbling difference means that a child is being tested not merely on the meaning of "canoe," but on

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the distinction between "boat" and "ship." *Giant*, a familiar enough word to black low-income children, becomes a problem when a child must select between "huge," "fierce," "scary," and "mean," any one of which is generally appropriate even though "huge" is the most precisely accurate definition. Children who know the four seasons of the year may well have difficulty with the cartoon below. Even if they do figure out what the cartoon depicts, the common word for the season shown is "fall," not "autumn."



- ☐ aunt
- ☐ autumn
- ☐ summer
- ☐ town

The picture below is another typical example. Hard as it may be for testers to accept, this cartoon no more brings to mind a "porch" to some of my students than a picture of a large cluster of tall buildings would bring to mind the word "project" to rural or suburban children.



- ☐ bedroom
- ☐ porch
- ☐ garage
- ☐ touch

The sentence comprehension question below requires of children a prior knowledge of glass making, for otherwise there is no way in the world that a child could select the expected answer. Certainly general intelligence would lead a seven-year-old child to connect a man with a torch and making glass.



The children are visiting the dairy for the afternoon.

The man pours a glass of milk for each child.

We went to the factory to learn how they make glass.



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On the other hand, the host of words, both technical and vernacular, that my Harlem students do know, and that are unfamiliar to middle class children, are never advantageous to them in the tests given.

Furthermore, when Hildreth suggests that a nine to 10-year-old's word bank consists of some 3,000 "common" sight words, she also is assuming the existence of thousands of additional familiar words which a child can handle in context. These words (and the contexts) will vary depending upon the life experiences of a child. For example, low-income children in Boston associated "examination" with a medical exam, while middle class children in the same city associated the word with a school test. In addition, even if we assume that many nine to 10 year olds will not have "Egyptian" or "laboratory" in their basic sight vocabulary (although they are in the MAT for children, ages eight and nine), it is not an insurmountable barrier if a child can make an intelligent guess with the help of contextual and phonic clues.\* But phonic clues, contextual guesses, and all the other useful tricks knows, "word attack skills" are useless to a child who is presented with a reading paragraph that includes too many words he is entirely unfamiliar with or which are being used in an unfamiliar context.

*re Subject Matter*

Vocabulary and subject matter are closely connected. Some semi-experts pretend that if you can truly read well, content is irrelevant ("a 'good' reader should be able to read anything.") In Fries' limited sense of the word, this is true, if the reading matter is *more or less* in the reader's native language. However, once we are dealing with comprehension, the whole argument becomes totally nonsensical, as any adult who reads knows.

Two years ago, I tried reading Jean Piaget's work on learning theory and found it nearly unintelligible. I could not have answered comprehension questions about it. I could not have defined many of the vocabulary words frequently found in Piagetian studies. In the past two years, I have not improved as a 'reader.' But I have learned the specific biological and psychological vocabulary that Piaget is using. I have discussed and reread his books and summaries of his findings. If given a short-answer test on a Piagetian paragraph today, I would score much higher because I could bring to it several

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years of experience in the content and style of the paragraph under scrutiny.

We confront this problem every time we attempt to read. If too many of the words are unfamiliar, or are being used in unfamiliar ways, or are couched in a style alien to our ear, or contain significantly new ideas or facts, it requires considerable time, energy, inclination, and assistance to master. Such is the task facing many young children in the simplest of the standardized reading tests.

In the 1970 MAT, designed for third graders, the easiest reading paragraph relates to the age of giant redwood trees.

"They are so big that roads are built through their trunks. By counting the rings inside the tree trunk, one can tell the age of the tree."

Imagine the bewilderment of the boy I talked with who was unfamiliar with the use of the word "trunk" in relationship to trees. Or the bewilderment of the many children with whom I chatted who conjured up pictures of round golden rings lying inside the tree, put there by god knows who once a year on their birthday. For such children, the whole story was a fairy tale of some sort, despite their competence to decode each and every word separately.

The two easiest paragraphs on the 1972 Primary II MAT for second graders centered on (1) a father and son fishing at a brook, and (2) a grandpa who is a forest ranger. Both "brook" and "forest ranger" drew a blank with the six-to eight-year-olds I sampled. Testing tricks helped them get some of the answers right anyway, but the point of both paragraphs entirely depended on these words which are not part of the latent vocabulary of most of the black urban children with whom I work.

Much of the content of these tests is also nonsensical to white privileged children, who dutifully respond by a type of intelligent guessing that relies very little on reading comprehension. But while all children are taught bad reading practices in this kind of test (and in the coaching we engage in to help children deal with such tests), it is most damaging to children who can least afford to be sidetracked by irrelevant test-taking skills and who are least familiar with some of the verbalisms that middle class children are adept at even when they do not have the slightest idea of what is meant.

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*re Sentence Structure*

The sentence structure used in many of the reading paragraphs, and, worse still, in the directions and questions, are complex syntactically, and lead to even more confusion.<sup>21</sup> It is thus unclear, for example, whether we are trying to find out whether a child can read a particular paragraph and understand it, or whether he understands our questions about what he has read. Piaget in his skillful oral interviews reminds us over and over just how complicated it can be to find out what a child actually does know and think, and the skill required in asking questions in order to distinguish between a badly put question and an ignorant answer.

In the 1970 MAT (Elem.) a child is asked: "As used in this story, the word *country* means.." Many children who were able to retell the story to me without difficulty were confused by this wording and read it over and over, clearly getting nowhere in the process. When I paraphrased it, by asking, "Does Juan come from this country?", the children said, "No, he probably comes from Puerto Rico." (Whether any of the children truly understood the distinction between country, city, county and state, I don't know. But few, indeed, are the seven-year-olds who do.)

In another example, I found that most of the children could read aloud and discuss intelligently a rather simple story about 'Mike's birthday present of a bicycle' (MAT, 1970, Elem.) Many of them were stumped, however, when it came to selecting the "best name or title" (a highly subjective and value-laden issue). Quite a few decided Mike's brother was "handsome" (*ugly-mean, handsome-generous*). Almost none understood the meaning of the phrase "a quiet side street" (they generally translated *side street* into *sidewalk*). They were divided as to whether Mike had *courage, fear, poor balance* or *wise parents* (and had sensible explanations for each). On that year's test, these particular children, trained to take an interest in what they read, generally did as well or better on the hardest paragraph, which they made almost no effort to understand, and relied instead on the test tricks I taught them: Read the questions first, and then look back for familiar clues.

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*re Test Construction versus Conceptual Development*

Even in what appear to be simple vocabulary subtests, the issues are very tricky. Even when the words themselves are familiar to all children, the manner of getting at their knowledge often deceives us into assuming a massive vocabulary deficiency where none exists.

The seven-year-old shown the picture below of a merry-go-round is expected to select "turn." But many chose "mile," just because it also began with an "m."



- ☐ turn
- ☐ run
- ☐ into
- ☐ mile

This may be a disguised intelligence test, but it does *not* tell us whether a child knows how to read the word "turn" or can use it appropriately.

In the next example, several children were baffled by this picture of a ball. They just kept looking for the word b-a-l-l which they knew so well, and failed to switch their mental set to consider



- ☐ leaf
- ☐ good
- ☐ new
- ☐ round

"round" as a possible answer. Does this mean they do not know the meaning of "round" or cannot read it?

Many a child, who knows "ink" as the stuff inside a ballpoint pen, was completely blank regarding the cartoon below from the 1972 MAT.



- ☐ forget
- ☐ page
- ☐ pencil
- ☐ ink

In the California Reading Achievement battery, many children insisted the item below was all wrong. "That girl is 'in front of' the blackboard," they insisted, and that is not listed as an alternative. When forced to choose, some selected "beside," some "below" and some "before." Afterwards they were indignant, insisting that "before" is *really* not used that way. They are probably right.



below the blackboard  
before the blackboard  
beside the blackboard  
behind the blackboard

In the 1970 MAT, the children objected also to this definition of "fair" -- "a *fair* day is one that is ...*clear*." None had ever heard it used that way, although the word itself was common enough.

For many young children, white and black, rich and poor, the manner in which these tests evaluate work knowledge is in conflict with what we know about the normal developmental style of a child's thought. The sentences of the type "*Afraid* means..." "To *know* is to..." or "*Quiet* is the opposite of..." seek appropriate synonyms or antonyms for the *underlined* words. Few children genuinely seek such synonyms or antonyms, however. This is only one approach to word definition and one very unlikely at this age, as any discussion with children immediately demonstrates.<sup>22</sup> Instead, children invariably give story examples that *incorporate* the word in question. For example, when asked what "afraid" means, they would tell me about things that make them afraid. They were able to select the right answer, "scared" because it was natural to *use* afraid and scared in the same context. ("I get scared when I am afraid,"

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said one little girl.) For this same sensible reason, the children I tested were divided equally between "carry" and "hold" when asked to complete the sentence, "to keep means to..." The children were making note of a relationship in life between two words.

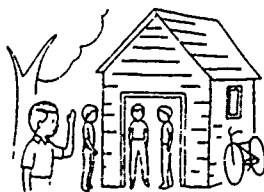
Similarly, the word "opposites" was generally confused with the concept of "different from." For many children, "tall and fat" were as obviously opposite as "tall and short," and "top and under" were opposites just as much as "top and bottom." Children who answer these correctly do so because they are familiar with certain word couplings. They are making unconscious word links, not actually distinguishing between *different from* and *opposite of*. They are rewarded for having lived in a milieu in which such coupling -- in the form of games or verbal intercourse -- was common. But the incorrect answers of the less privileged children show at least equal *reading* skill, *comprehension*, and *conceptual* maturity.

#### *re Cultural Conventions*

In subtle ways, the conventional symbols in use in reading tests also favor middle class children. Sometimes this is due to real life experience and sometimes merely to certain accepted symbols for such experiences. This is a problem in all parts of the test which utilize cartoons.

Sigel, Anderson and Shapiro (1966) did a series of studies, reported on by Courtney Cazden, which demonstrated that lower class black preschoolers had difficulty categorizing pictures of objects where they had no difficulty labeling the objects themselves.

In the 1970 MAT (Elem.) drawing below most of the children at PS 144 empathetically, and incorrectly, decided that the boy in the foreground was "lonely because he does not have any friends." Their reasoning was unassailable, as was their reading.



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Other researchers have noted that certain conventional representations are accepted by one class or cultural subgroup and not another. For example, the Educational Testing Service recently did an item analysis of the answers given on a Peabody Picture Vocabulary Test. "On all items, the MSES (middle class) scored better than the LSES (lower class). On most items, the two groups share similar patterns of option choice, and the 'distractors' seem to be working in similar ways. There are notable exceptions, however." For the word, "yawning," the middle class children generally selected Option 2 (correct). It showed a child yawning in the stereotyped way (hand over mouth). The girl in Option 3 also had her mouth open, however, and certainly could have been yawning. This wrong answer was often selected by lower class children. It does not take a great many such differences to widen the gap a little further when the scores are totalled.

#### *re Value Judgments*

The tests are also laden with both obvious and latent value judgments which have a cultural and class bias. Courtney Cazden notes examples on the Wechsler Preschool and Primary Scale of Intelligence. One item asks, "Why do you need to wash your face and hands?" The highest answer is either "to get clean" or "so you won't get germs." "They're dirty" or "Mother tells you to" are given lower ratings although they are quite sensible and largely indicate a certain type of home environment. Lower class children were also more apt to say that "to confess...is foolish" (low rating answer). Is this merely realistic?

In a report by Entwistle on black inner-city fifth graders, a different value was placed on the word "cheap" than assumed by the test makers. While to the testers it had a negative connotation, many of these children simply interpreted it as "not expensive."

In the California battery, children in first and second grade are tested on subtler aspects of reading comprehension by the following:

"Good afternoon, little girl," said the policeman. "May I help you?"

"I want to go to the park. I cannot find



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my way," said Nancy. Please help me."

The child is to select the one right ending for this story:

The policeman said,

- a. Call your mother to take you.
- b. I am in a hurry.
- c. I will take you to the park.

In the 1970 MAT there was a story about two school-mates, John and Juan. John helps Juan learn English. The child is then asked:

How did Juan probably feel toward John?

- a. Grateful
- b. Unfriendly
- c. Cautious
- d. Fearful

A thoughtful urban child might well ponder this a long time trying to decide in truth whether Juan is more likely to feel fearful, cautious, or unfriendly. The "correct" response, "*grateful*," might well seem the least likely.

The test makers seek such value-laden responses to get at a child's ability to make inferences, use critical thinking, evaluate, etc., as against the simpler reading comprehension skill (fact finding). But judgments and evaluations are fraught with biases. Who in America in 1973 can be so innocent as not to be wary of them.

One has merely to spend time with some of the brightest, most dedicated, young students in Harlem schools to find ample confirmation of the extent to which such tests complicate their reading lives, undermine their self confidence, lower the expectations that their parents and teachers have for them, and turn them off from reading.

Bright and imaginative Karen worked out a very skillful interpretation of the picture below. "The man up front is painting," she explained proudly to our study group. "But the answer isn't this one about painting, because he may not be a fireman. He hasn't a fireman's hat on. So it must be about those men back there who are carrying things. See this man in the fireman's hat? That suff he is holding must

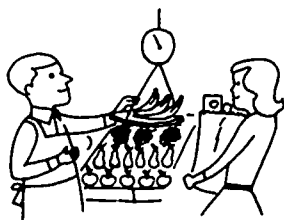


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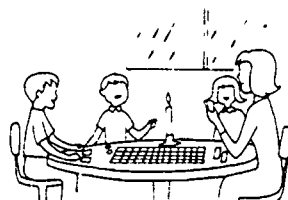
be for putting out fires." So she selected, "The fireman has tools for putting out a fire." Her reasoning convinced the other children, including those who had answered correctly. ("The fireman is doing some painting.") Her only mistake was not knowing a fireman's uniform minus the hat and/or being too suspicious of the test. The children who had been right had generally not bothered to read all the answers, but on noticing the word "painting" in the first option had sloppily arrived at the right answer.



Two other children engaged in a verbal battle over the drawing of a lady shopping. "The man weighs the fruit before Mother buys it" (the correct answer) couldn't be right, according to one girl. "Where will Mother put the fruit he's weighing? She's already carrying one bag that is too full." Her classmate tried to demonstrate how Mother could carry another bag. The first girl remained unconvinced.



The picture below puzzled many children, who could think of no logical connection between any of the answers offered and the picture. The right answer was dependent on first noticing the detail of rain streaks outside the window (and knowing this to be a conventional method of showing rain), connecting these with the idea of a storm, then linking a storm to a power failure, and finally, all of this to the candle on the table:



In the scene below, "Mary's books will get wet in the rain" is the correct answer. But, said many children, surely she would not let her books get wet. Look how happy she is. She must have them covered, although this detail cannot be ascertained from the picture. Most children selected one of two wrong answers: "The rain will not hurt the books" or "Mary is taking good care of the books." I arrived at the right answer only through devious adult logic: If the children were right, two answers would be valid. Two answers cannot be right on a standardized test. Therefore Mary's books are not covered!



Whatever weaknesses their answers might have, greater reading skill, no matter how we defined it, would not have helped these children avoid their mistakes.

These are examples, which can be found over and over again, of children penalized for the very qualities one most dearly treasures in them: their dogged determination to make sense of the written word, to use their own experiences, to trust their own good sense, to respect the values of their families.

In contrast, many a middle class child did not need to bother to even read the paragraph in order to match or outscore these bright lower class children. He could merely fall back upon a lifetime of habits, associations, verbal phrase mongering, and accepted

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stylized conventions taken right out of his own home and world. R. Carner, in a study on speed reading, notes the extent to which middle class students can obtain high scores without ever reading the passages on norm-referenced reading tests. "Someday, college courses on testing will start teaching students that the traditional test-building procedures are not appropriate for measuring change, or gain, or improvement," he says.<sup>23</sup> They merely tell us, in other words, that differences exist.

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### 3. BIAS OF TESTS TOWARD CONFORMITY AND STEREOTYPE THINKING

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The above examples are only a few among many which demonstrate how such tests are biased against any child who thinks independently and imaginatively, regardless of class or cultural background. I was confounded time after time by the brilliance and originality with which bright children defended wrong answers. Often they convinced me that my "right" answers were indeed shallow, and the result of sloppy and off-hand thinking. They put together details and clues with a logic that surpassed their years. But they did it to no avail. This happens to middle class children too, and is the major basis for the objections raised to standardized college entrance tests by Banesh Hoffman.<sup>24</sup> He argues, persuasively, that these tests reward shallow and dilettantish thinking, and penalize that small but crucial minority who know enough and think clearly enough to see the ambiguities, paradoxes, and contradictions that the testers themselves were too simple-minded to be even aware of.

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### 4. BIAS OF TESTS TOWARD EARLY READING

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There are many children who learn to walk at 18 months, where their peers began at nine or 12 months. At the age of six years, are they distinguishable? No. But I dare say they would be if we had begun regular walking tests when they reached nine months, plied anxious mothers with statistical data on their comparative performance, produced prescriptions for early walking, or labeled some slow walkers and others superior or gifted. The analogy is far from exact -- reading, unlike walking, does take considerably greater conscious adult intervention. (How much it takes is still disputed and many experts would argue that an analogy between learning to

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*talk* and learning to read could accurately be made if we created an environment in which reading was as useful and as gratifying as talking is.) But the analogy is useful in reminding us that the issue is not "how soon" a child begins, nor even "how soon" a child gains mastery, but whether at a suitable age a child can walk. The importance of those few extra years of "walking practice" soon dims as the slower developer catches up. But in our school system, the slower learner rarely has that chance. He is quickly earmarked, and his future labeled.

At one time this was precisely the purpose of early testing: to classify, differentiate, separate the wheat from the chaff. It was the first in a long process of screening to select those worthy of an elite education. It was an effort to be more "democratic" by providing a chance for a small number of "meritorious" children from the lower and lower-middle classes to join the established club. With such a purpose in mind it was quite acceptable to have tests which were merely comparative and which, by their very nature, only some could succeed at. That it penalized the many seemed irrelevant. For the first time it provided an opportunity for those who had never before dreamed of secondary, much less higher, education. But today, when we claim the obligation to teach every child to read, and to read intelligently enough to deal with the kind of subject matter once considered way beyond his or her reach, we cannot use these devices of the past. For the purposes of these early tests mere correlations were sufficient regardless of the cause. For their purposes the fact that half the children *had to appear objectively* inadequate was a virtue, not a vice.

That this aspect of testing falls most heavily upon the poor is obvious, since (1) they are more likely, for reasons described earlier, to appear to be slow in developing reading skill as measured by standardized tests, and (2) they are less likely to get a second chance because of the nature of their schooling, the pressures on their families, and their unlikely access to specialized guidance outside of the school.

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#### 5. SPEED BIAS OF THE TESTS

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Just as they are biased against the original mind, so, naturally, are tests biased against the slower

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or more cautious thinker. There is little evidence, however, to support the assumption that speed is a very important attribute and one which should be as highly prized as it is on these timed devices. Furthermore, this aspect of the test clearly hits hardest again at children for whom the test material is less familiar. As R. Carner notes in his study on speed reading, the more unfamiliar the content the more slowly one must read in order to get equal comprehension.

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#### 6. EMOTIONAL BIAS OF THE TESTING SITUATION

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While this bias falls heavily upon those middle class children who become emotionally paralyzed and intimidated by the competitive pressures of the testing situation, they fall more heavily still upon children whose general school confidence is already the shakiest. No lower class child, coming from a family with a history of school failure and anxiety, can enter the school with entirely sanguine feelings. And the expectations of the school, even the well-meaning progressive school out to "prove" that all children are equal, weigh more heavily on him.

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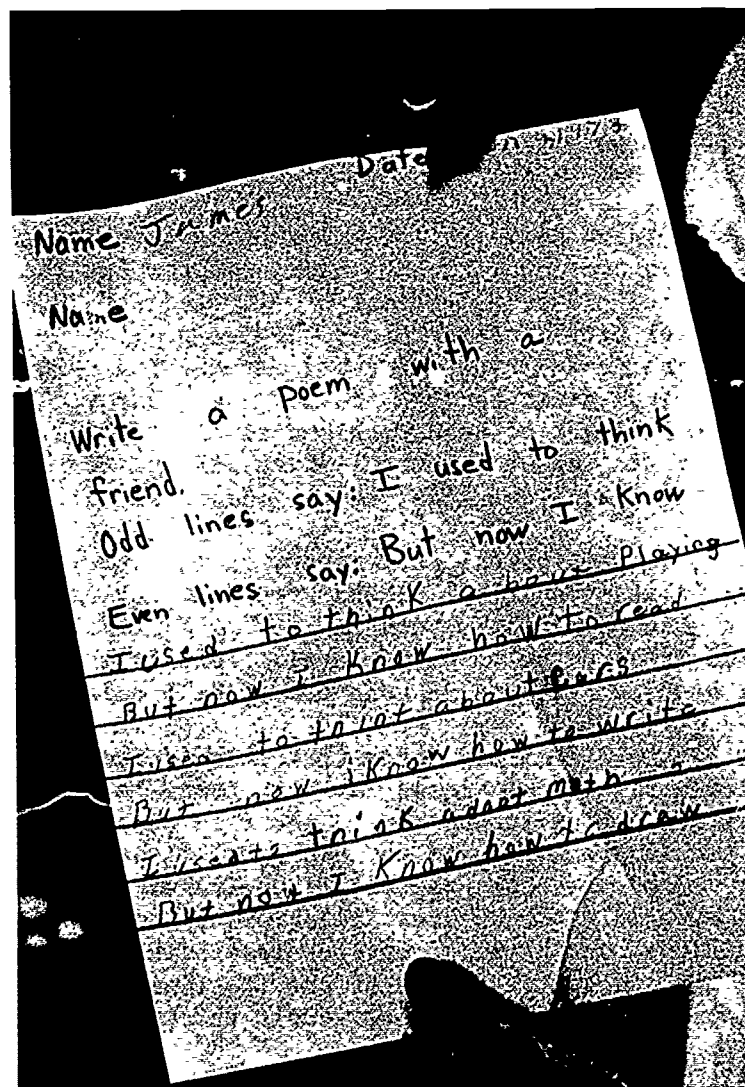
#### 7. TEACHING STRATEGY AND LEARNING THEORY BIAS OF TESTS

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Any given test is based on certain learning assumptions -- theories of causation (implicit or explicit), stages of development, etc. Such tests then lay a heavy burden upon any teacher, school, or parent who seeks to support a child who seems to be developing in a different way and who tries a different road to educational competence than the test marks out. If a child is required to take a given test that will measure his knowledge of "vowel sounds," "capitalization," or "proper grammar," what teacher, school, or parent is not going to attempt to teach and reteach what the test measures, even if it is counterindicated (for all children or a given specific child). It is these school practices that fix the predictability of the first failure for a child who did not know what the test tests.

If I designed a fancy preschool test, which included items testing skill in tying shoes (with "scientific" evidence regarding a correlation between such skill and later success in reading), I might induce some

foolish teacher to press all her students into shoe-tying practice, in the hope that it would improve their reading, or anyway raise their prereading scores. For children who were, for one reason or another, less successful at tying their shoes, the effects on their later reading efforts might be serious indeed. Laugh as we might at such foolishness, is what we are doing currently significantly different? What a good diagnostic test should be aimed at (no matter how it is given) is uncovering the strengths a child has and the strategies available to him. In fact, studies of children who succeed easily at reading often indicate that they too suffer from all kinds of apparent perceptual, auditory, or coordination disabilities. It is because of their ability to bypass their deficiencies through the utilization of compensatory strengths that they end up with both competence and confidence intact.





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## IV. Test Scores

To compound matters, the scoring system of the major standardized reading tests makes further fools of us all.<sup>25</sup> Thus, a few years back, a college education teacher complained publicly that despite all the federal funds being poured into schools, the average second grader was still scoring 2.7 on the standard reading test, as he had five years before. Indeed, the average fourth grader had made no progress: he scored 4.7, as he did five years earlier. Other comparisons were equally discouraging. In the same vein, a well-meaning Manhattan school teacher recently demanded at a staff meeting that no teacher set a goal of less than minimally competent reading for every pupil in her class. When asked what she considered to be minimal competence, she said: "Well, at the very least, grade level on the tests."

A progressive community school superintendent in Manhattan announced that he had a program for the future. By 1979, 95 percent of all students in his inner city district are to be progressing at least one grade level per year, as measured by the tests, from first through ninth grade. Why and how? By sheer weight of hard work and faith in children, the superintendent asserts. After all, he reasoned, why should not "our kids" be as good as any other?

Almost no one, parent or teacher, seems aware, however, that even if all second grades in our nation were able to fluently read *THE NEW YORK TIMES*, half would still be below grade level. That is simply the name of the game -- half above, half below.

The figure 2.7 merely means that this is the norm (middle figure) of scores for that test, based on children taking it who are in their seventh month of second grade. Toward the two ends of the scale, however, even these grade-level equivalents go wild and have only the shakiest relationship to reality. Decisions must be made, more or less blindly, as to the top and bottom scores of the test. As a result, on one of the MAT tests previously referred to, 77

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answers jumps the score to 5.2, and a mere three more catapults a student to 8.4. At the other end, average luck at guessing (assuming a student skips nothing) will place a second grader on this test at 2.0. A few unlucky guesses and he zooms down to 1.3. If he just leaves the whole thing blank he gets 1.0. Does that really mean that the median for a child entering first grade is a zero on this test? If the same second grader could take the next harder test, intended for third and fourth graders, a little knowledgeable guessing will score 2.7 (his grade level). Incidentally 90 out of 95 scores 9.6. Five additional correct answers and a child is ready for college (12.9). If one could get away with it, clearly the trick is to use the most advanced test available. Imagine the proud mother who can announce that her second grader scored two years above grade on a test designed for sixth grade students.

Given the nature of the scoring system and the test norms, even the makers of these tests deny that they have very exact validity even within their own area terms. A range of four-to-six months either way (i.e., a score of 3.5 is equivalent to a score of 3.0 to 4.0) is a matter of chance and should not be regarded seriously. Yet in many schools much is at stake in such differences, in terms of money, prestige, special classes, entry into a more prestigious high school, and so on.

The scoring is also very much open to question given the various levels of "cheating" that are now commonplace. Any test begins to lose validity as diagnostic tool when coaching takes place in connection with it. Indeed, coaching is now so widespread that a school that does not engage in it is clearly being unfair to its students. Cheating takes on various forms, from this kind of "legitimate" coaching all the way to outright filling in of student answers, and a myriad of lesser crimes in between. To eliminate such cheating on these annual massively given and lengthy tests would merely exacerbate all the biases previously documented. In fact, some of the current cheating -- extending the time, paraphrasing certain test directions, alerting children to tricky questions, etc.-- is an honest attempt by teachers to undermine such bias.



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## V. Alternatives

In view of public dismay over reading, and parental anger that has long been bottled up by vague school reassurances, an alternative is needed.

Such an alternative lies in resurrecting, reinforcing, and utilizing every tool that a child does have, that he brings with him to school, and that can be part of his arsenal of attack in mastering his own environment. We need to create an environment within school that helps him and us to find such strengths and such strategies. To do this, we need an environment that makes children so strongly want to learn that they are our allies in the search for better methods. We need an environment in which many possibilities are present, in which we can see a child in action, watch him "thinking" as he goes about problem solving tasks. We need an environment in which adults are able to note such efforts in the interests of finding new methods of intervention, not merely to document a child's defeat. We need an environment in which a teacher's planning and recording is not a "cover" -- to prove to parents, supervisors, and the public that we professionals "did our best" and that the fault lies with a child (or his parents). Rather we seek teacher planning and recording as a means of collecting data to help plan better for that child. Such data collection and analysis should be kept separate and apart from any testing of sample populations for the purpose of collecting longitudinal research data regarding reading programs or trends. For the latter purpose, brief tests given to a random sample of the population will not merely suffice but will be more valuable than the current massive testing. Random sample testing cuts down on the kind of coaching and cheating which so badly distorts the value for research of current test programs.

Let us try to leave "accountability" for a child's progress as a matter between that child, his teacher, and his own parents. Let us demand "only" that the teacher and school be able to

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demonstrate that they are aware of each child, that they are planning for each child, that their plans are being continuously reassessed and modified, and that they are always prepared to change the structure of the school and class if necessary to meet the needs of a child.

All of this will require a clearer understanding of reading itself. I tested a bright young fourth grader last spring with an individual assessment inventory (the Silvaroli test, W.C. Brown, Inc.). It consists of lists of vocabulary words, graded by difficulty, plus eight fairly short "stories" in a similar order of difficulty. The boy zipped through them all making virtually no errors and answering all my "standardized questions" with ease (the questions, but *not* the answers, are standardized in this type of inventory). "I haven't got anything more difficult for you to read -- that's the most advanced one I have," I announced apologetically at the end. He looked at me puzzled, "But you can see, I can read." I appreciated his point, but pursued it. "Well, aren't there some things that are harder for you and some things that are easier?" "Yeah, of course. I read stories about sports best because I know a lot about it."

There -- he has said it all. But parents and teachers have yet to hear and understand its implications.

There is no point in forever giving reading tests *qua* reading tests. There are specific reading skills, as Fries noted. At some point, these become habitual and unconscious. A child then "reads." Just as in the analogy to walking, at some point between age two and five one is aware that a child is a walker. He will not become a better walker. But as time passes the function to which he can put his walking changes. He can now walk to the corner store, he can plan out a walking trip with the use of maps, he can better pace his speed of walking or predict the time it will take to get someplace. He can judge the relationship between his speed of walking and the space between him and a car, or the width of a plank in relationship to his steadiness, or he can even decide whether walking is the wisest method of travel or try to organize his life so that he won't have to walk so much. These are critical skills -- but are they walking skills? Or are they skills in *utilizing the ability to walk*. This latter requires intellectual and creative talents of a more general nature; it includes certain specific

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knowledge; it involves skill in other disciplines.

This analogy holds for reading. Minimal reading competence begins when a child (or adult) no longer need focus on the mechanics of the reading act, but is oblivious, most of the time, of the existence of such mechanics and is concerned instead with its function, its pleasures, the ideas contained in the words. The educational task is to help the boy I tested to feel about mathematical ideas, or science, or history, as he now does about sports, so that he will be as good at reading in those areas as he now is in his own special field of interest.

Charles Fries refers to this last stage of reading as "that time when reading becomes a *means* of acquiring and developing experience." For the first time one can truly say that intellectual development, cognition, and even affective behavior can be considerably increased or altered through the act of reading. At earlier stages, while a child could obtain some minimal information and esthetic pleasure through reading, on the whole the act of reading itself was so energy-consuming that no school could (or should) rely upon it as the major source for children's information about their world, their development of reasoning ability, their vocabulary growth, etc. In addition, given the abstract nature of reading, and our current knowledge about young children's thinking processes (concrete, operational, "nonlogical"), one would not want to rely too heavily on book learning even for the more precocious young reader.

The problem with respect to reading in the elementary school years is to find a way of objectively evaluating the degree to which a child is making acceptable progress toward both this minimal kind of reading competence, as well as growth in reasoning, thinking, language, imagination, etc.

Toward this end, the teacher needs:

1. An understanding of the various possible avenues to language competency and the available skills and techniques that might match an individual child's needs and strengths.
2. To understand a child's own method of learning -- how he deals with his world, the strategies he employs, the tools he uses -- in the environment which the teacher has

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structured for this purpose, as well as in the playground, lunchroom, etc.

3. To have access to and knowledge in using various kinds of individual inventories, check lists or diagnostic instruments that can assist her to spot or assess a child's learning approach.
4. To keep such records that are needed to make periodic reassessments, which can also be made available to parents and supervisors for examination, review, and discussion.
5. To keep other records regarding input into the classroom -- materials used, subjects introduced, new interests, creations produced, etc. -- which also are periodically reviewed and reassessed.
6. Expert diagnostic assistance in those cases where the teacher cannot make an appropriate match or where progress seems unaccountably slow, which can be fed back into the classroom.
7. Continued research, using the kind of teacher-pupil data gathered above, of various successful and unsuccessful strategies that might lead to new insights of use in the classroom.
8. An end to competitive normative testing of reading as a skill. Children either can or cannot read, either are or are not progressing. By their very nature these tests are most injurious to precisely those who need their help most.

Where there is doubt, what is needed is a *deeper, fuller and more individualized* assessment, not a shallower and less reliable one. Brief reading tests given to a whole class are perfectly reasonable when necessary for the *limited* purpose of helping call quick attention to that part of the class requiring priority attention. But the diagnosis must be individual and focused on what a child *can* do well, and where his interests and drives lie. The standardized paper-and-pencil group tests -- long, tedious, complex, and focusing on presumably discrete skills -- are above all inadequate in giving us insight into our most troubled readers.

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## VI. Summary

Pupils, says Benjamin Bloom, "will vary in the time they require to 'achieve mastery' but whether they learn to master or not depends upon (a) whether they are prepared to spend the required time and energy they need to devote to the task, and (b) whether they are allowed to do so. The former is related to motivation, the latter upon the structural organization of the class and school." <sup>26</sup>

It is upon these matters -- finding ways to provide or make space for student initiative, drive and energy; creating the organization that permits it to thrive and to be a tool for success -- that our efforts must focus. The recent concern for humanizing the school is too often an afterthought, tacked onto an otherwise prescribed technology that denies the student's individuality and human concern. It forgets that humanizing the school can be a major weapon in the struggle to wipe out illiteracy only if we allow the humanization to go deeply into the heart of the learning situation itself.

It is because of the general passivity in this area -- the continued maintenance of school settings that are known to be defeating to so many children, the use of techniques of school organization that have no chance of tapping the potential initiative and drive of our students -- that the tragedy keeps being repeated. In the interest of early success on reading tests, we often use techniques that counteract long-range student motivation, even though we recognize its critical character. We do the same in areas of math, for example. We drill children on a few simple arithmetic formulas because they make children look competent quickly, even though in doing so we often cause a basic distrust of math, making it hard to awaken that sense of math as a perfectly sensible, accessible, and exciting skill. In many a classroom designed for early reading success, we find teachers consciously limiting oral language, cutting down on opportunities for the exercise of reasoning, judgment, or creative thinking, and largely stripping the room of anything that

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might truly matter to and excite a young child. Yet we know how absolutely vital all these are to being a functioning reader in the long run, rather than an early imitator of reading. If we actually value reading, rather than the mimic sham, for all it offers in terms of access to a rich tradition of language, ideas, and know-how, then we will need to be more respectful of the development of a child's intellectual capacities, general linguistic sophistication, and creative interest and curiosity.

This may not be the *only* path toward the barest literacy skills, but as Arthur Pearl rather poignantly reminds us, "bare literacy has no marketability." If we intend to make available the very best education for all our children, we cannot aim at the start at minimal competence and bare literacy. We need to find in each child that which will enable him to put forth the needed energy and determination to fulfill his own unique potentialities.

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  15. Cazden, *Child Language and Education*. p. 157.
  16. R. Burling, *Man's Many Voices*, p. 179.
  17. William Harmer, "Implications for Teachers," in *Reading for the Disadvantaged*, p. 196.
  18. Fries, *Linguistics and Reading*.
  19. Cazden, *Child Language and Education*, p. 156.
  20. Gertrude Hildreth, *Teaching Reading*, p. 95.
  21. Cazden, in *Child Language and Education*, reports on study by Ervin and Tripp on precisely this issue, p. 362.
  22. Ibid., p. 87.
  23. R. Carner, "Speed Reading Exposed," *Psychology Today* (August 1972), p. 30.
  24. Banesh Hoffman, *The Tyranny of Testing*.
  25. Lloyd B. Hunter and Frederic A. Rogers, "Testing: Politics and Pretense," *Urban Review* (December 1967). See pp. 5ff. for an extensive examination of scoring methods, item analysis, etc.
  26. Quoted in Pidgeon, *Evaluation of Achievement*, p. 37.



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## VIII. Biblio - graphy

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# Center publications

The following publications are now available:

From *City College Advisory Service to Open Corridors*  
Room 214, Klapper Hall  
Convent Avenue at 136th Street  
New York, New York 10031

March and June 1972 issues of NOTES FROM CITY  
COLLEGE ADVISORY  
SERVICE TO OPEN CORRI-  
DORS @ 75 cents a copy

Please make checks payable to the Advisory Service.

Three papers (mimeo), free of charge:

Description of the Open Corridor Teacher

Steps in Setting Up an Open Corridor Program

Open Corridor Classrooms

From *The Workshop Center for Open Education*

October and December 1972 issues of NOTES FROM WORK-  
SHOP CENTER FOR  
OPEN EDUCATION

Monthly Calendars of Workshop Center activities

The following publications are being prepared:

Position paper on *Evaluation*

Curriculum bulletins on *Science, Growth and*

*Living Things, Perception*

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*The Workshop Center for Open Education* is supported by a grant from the United States Office of Education under Title III of the Elementary and Secondary Act of 1965. It operates in conjunction with the City College Advisory Service to Open Corridors. The Center staff includes Georgia Delano, *Coordinator*; David Bole, Bonnie Brownstein, Ann Hazlewood, Martha A. Norris, Evangeline Richardson, *Advisors*; Ruth Dropkin, Arthur Tobier, *Editors*; and Lillian Weber, *Director*.

Requests for information and publications should be addressed to *The Workshop Center for Open Education*, Room 6, Shepard Hall, City College, Convent Avenue at 140th Street, New York, New York 10031.

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PENNSYLVANIA STATE UNIVERSITY

**Pennsylvania Agricultural Experiment Station.**

**1916** Pennsylvania State University  
106 Armsby Bldg.  
University Park, Pa. 16801  
Tel: (717) 865-5419

**AREAS OF INTEREST:** General agriculture; biochemistry; agricultural economics; rural sociology; agricultural education; agricultural engineering; agronomy; animal science and nutrition; microbiology; botany; plant pathology; dairy science; forestry; horticulture; poultry science; veterinary science; wildlife; zoology; entomology; land use.

**HOLDINGS:** 80,000 books; journals, technical reports.

**PUBLICATIONS:** *Science in Agriculture* (quarterly); technical reports, conference proceedings, bulletins.

**INFORMATION SERVICES:** Answers inquiries; makes referrals; provides consulting services; permits onsite use of literature collection.

**Branch Offices:** Agricultural Research Center, Rock Springs, Pa.; Southwestern Field Research Laboratory, Rector, Pa.; Fruit Research Laboratory, Arendtsville, Pa.; Southeastern Field Research Laboratory, Landisville, Pa.; Erie County Field Research Laboratory, North East, Pa.

**Pennsylvania Transportation and Traffic Safety Center**

**1917** Pennsylvania State University  
215 Shields Bldg.  
University Park, Pa. 16802  
Tel: (814) 865-9539

**AREAS OF INTEREST:** Engineering, economic, and psychological aspects of transportation and traffic safety.

**HOLDINGS:** 500 books; 25 periodical titles; 500 reports. The Center also has access to the collections of the University Library.

**PUBLICATIONS:** Reports.

**INFORMATION SERVICES:** Information is made available through the Pennsylvania Technical Assistance Program (PENNTAP). In conjunction with PENNTAP, the Center provides a limited consultation and counseling service for local traffic and governmental agencies.

**Small Industries Research**

**1918** Pennsylvania State University  
316 Willard Bldg.

1920

University Park, Pa. 16802  
Tel: (814) 865-9519

**AREAS OF INTEREST:** Engineering and scientific research and development for small industries (projects are initiated through requests from small companies).

**PUBLICATIONS:** Research reports.

**INFORMATION SERVICES:** Answers inquiries. Reports on research results are made available to all interested companies.

**Waste Water Renovation and Conservation Research Project**

**1919** Institute for Science and Engineering  
Pennsylvania State University  
University Park, Pa. 16802  
Tel: (814) 865-5419

**AREAS OF INTEREST:** Water renovation and conservation by disposal of municipal sewage effluent on agricultural and forest lands; ecological changes in plants and animals and influence on crops in treated areas; reuse of water by ground-water recharge; monitoring system for water quality sampling; hydrology and pedology of land areas used for spray disposal of liquid wastes; design, development, and testing of sprinklers and irrigation systems for waste disposal.

**HOLDINGS:** Data.

**PUBLICATIONS:** *Reports* (published by the University, available on request from the Project); *The Living Filter* (motion picture);

**INFORMATION SERVICES:** Answers inquiries; makes referrals.

**PENNSYLVANIA TECHNICAL ASSISTANCE PROGRAM (PENNTAP)**

**1920** 501 J. Orvis Keller Bldg.  
University Park, Pa. 16802  
Tel: (814) 865-0427

**AREAS OF INTEREST:** Engineering; physical and natural sciences; materials science; computer technology; problems of Pennsylvania business and industry relating to design, processing, production, and packaging.

**INFORMATION SERVICES:** Disseminates information to any business or industry in Pennsylvania. Services are especially designed to meet the needs of smaller and medium-sized businesses and industries. Modest fees are charged for some services. PENNTAP services are provided through the following projects:

1921

### **Audio Tape Library**

1921 PENNTAP Audio Tape Library  
201 Wagner Bldg.  
University Park, Pa. 16802  
Tel: (814) 865-9531

Under this project, an Audio Tape Library on science and technology that would be of benefit to business and industry in Pennsylvania is maintained by the University's Division of Broadcasting. Selected conferences, seminars, workshops, soundtracks of videotapes, and interviews with leading scientists and engineers are tape recorded and master tapes are permanently filed in the Audio Tape Library. To date, more than 120 tapes on such topics as air pollution, biomaterials, composite materials, computers, metalworking and joining of metals, mining ventilation, mineral sciences, textile technology, and water pollution are available to business and industry. A complete catalog of tapes is available on request.

### **Information Center for Metal Plating and Coating and Information Center for Metal Powders**

1922 PENNTAP Information Center  
Franklin Institute Research Laboratories  
Philadelphia, Pa. 19103  
Tel: (215) 448-1227

The Franklin Institute Research Laboratories operate information centers for two specialized industries in Pennsylvania: (1) those engaged in plating, coating, and engraving metal products; and (2) those using metal powders for the manufacture of end products or components. Knowledge gained from such sources as patents, Government-sponsored research, and foreign literature is interpreted as to its potential applications to development and production and disseminated to these industries. The Centers supply technical information only; they do not provide experimental development assistance.

### **Library Information System**

1923 Pennsylvania State University  
302 Pattee Library  
University Park, Pa. 16802  
Tel: (814) 865-9242

Services of the Library Information System are available to all industry in Pennsylvania. Companies may send specific technical questions to the librari-

### **PENNSYLVANIA TECHNICAL ASSISTANCE PROGRAM**

an of the Pennsylvania State University Commonwealth Campus nearest the inquirer, or directly to the Library Information System at University Park if the company's area is not served by a Commonwealth campus. A search of the technical literature is made by library specialists in the appropriate subject area. Copies of the pertinent literature are then sent to the industrial inquirer. If the inquiry is outside the realm of the published literature, the inquirer is referred to other sources.

### **Materials Research Laboratory**

1924 Pennsylvania State University  
1-112 Research Bldg.  
University Park, Pa. 16802  
Tel: (814) 865-3421

The Materials Research Laboratory, which coordinates PENNTAP's materials science and engineering program, makes referrals to on-going programs in materials science and engineering and conducts seminars, workshops, and short courses in materials technology. The Laboratory's areas of interest include: materials science and engineering; X-ray diffraction data on inorganic materials and computer programs for indexing the data; X-ray wave length tables; instrumental analysis of solids; elastic, electrical, and magnetic properties of solids, especially ionic high-temperature materials; and elemental and isotopic composition of various biological tissues.

### **PENNSYLVANIA TRANSPORTATION AND TRAFFIC SAFETY CENTER**

see Pennsylvania State University

### **PENNWALT CORP.**

#### **Technological Center Library**

1925 Pennwalt Corp.  
900 First Ave.  
King of Prussia, Pa. 19406  
Tel: (215) 265-3200

AREAS OF INTEREST: Analytical, inorganic, organic, and physical chemistry; chemical engineering; chemical product applications in metal processing, laundrying, dry cleaning, agriculture, textiles, plastics, rubber, and other specialties.

HOLDINGS: 4,200 books; 4,000 journals; reports, patents, films, photos, Government publications, chemical manufacturers' literature.

#### **PENNWALT CORP**

**INFORMATION SERVICES:** Provides reference and duplication services; permits onsite reference by research workers of industry and Government and by university faculty.

#### **PERKIN-ELMER CORP. CENTRAL LIBRARY**

**1926** Main Ave. Mail Station 249  
Norwalk, Conn. 06852  
Tel: (203) 762-4798

**AREAS OF INTEREST:** Optics; lasers; holography; chemical and biomedical instrumentation.

**HOLDINGS:** 15,000 books; 500 periodical titles; 25,000 reports.

**INFORMATION SERVICES:** Provides limited reference services to ASIS and SLA members; provides limited duplication services; makes interlibrary loans; permits onsite use of collection, subject to security clearance.

#### **PERKINS OBSERVATORY LIBRARY**

**1927** P.O. Box 449  
Delaware, Ohio 43015  
Tel: (416) 363-1257

**AREAS OF INTEREST:** Astronomy; astrophysics.

**HOLDINGS:** 7,500 books and bound periodicals; many charts, reprints.

**INFORMATION SERVICES:** Answers inquiries; makes interlibrary loans through the Ohio State University Library; permits onsite reference by qualified persons.

#### **PERLITE INSTITUTE INC.**

**1928** 45 West 45th St.  
New York, N.Y. 10036  
Tel: (212) 265-2145

**AREAS OF INTEREST:** Properties and uses of perlite, including its use as an insulating material when used as an aggregate to produce light weight, insulating concrete and plaster, and as loose fill insulation; physical properties of perlite-portland-cement and perlite plaster mixes; fire resistance and sound ratings of perlite plaster and concrete construction; properties of perlite for its use as an insulator in cryogenics; studies and experimentation in perlite's use as a horticultural aid, a carrier for fertilizer, and an inert industrial filler.

**1930**

**HOLDINGS:** Photos, reports, pamphlets, standards, graphs, tables, bibliographies, display materials, press releases, clippings, reviews, motion pictures, maps, charts, preprints, reprints, posters, data.

**PUBLICATIONS:** Bulletins to members; reports, data sheets, standards, bibliographies, press releases, films.

**INFORMATION SERVICES:** Answers brief inquiries; makes referrals, provides consulting, bibliographic, and duplication services.

#### **PERMAG PACIFIC CORP.**

**1929** 5441 West 104th St.  
Los Angeles, Calif. 90045  
Tel: (213) 776-5656

**AREAS OF INTEREST:** Design and application of metallic and ceramic permanent magnets; manufacture of special and standard magnets, magnetic assemblies, and shielding devices; design and application of technical ferrites and ceramics, particularly recording head and microwave ferrites and complete recording heads.

**HOLDINGS:** Samples of most known permanent magnet materials; technical literature and industry standards on magnetic materials.

**PUBLICATIONS:** Technical literature on magnets, ferrites, and magnetic materials; catalogs of standard magnets, ferrites, and magnetic materials.

**INFORMATION SERVICES:** Answers inquiries; makes referrals; provides consulting services; provides testing and identification of permanent magnet materials; provides quotation service; supplies prototypes; permits onsite reference. Services involving less than one hour of the company's time are provided free.

The Corporation has facilities for developing, manufacturing, testing, and calibrating magnets, magnetic devices, and recording heads.

#### **PERMANGANATE INFORMATION SERVICE**

see Carus Chemical Co.

#### **PHILADELPHIA ELECTRIC CO. LIBRARY**

**1930** 900 Samson St.  
Philadelphia, Pa. 19105  
Tel: (215) 922-4700 Ext. 500



1931

**AREAS OF INTEREST:** All phases of electrical, civil, and mechanical engineering; power generation (steam-hydro-nuclear); power sources; air conditioning; chemistry; computers; control systems; economics; electronic data processing.

**HOLDINGS:** 4,200 books; 2,900 bound journals; 2,000 pamphlets; 110 drawers of 3 by 5 cards of technical abstracts; maps, charts, data, reports, proceedings.

**PUBLICATIONS:** Abstract journals, bibliographies.

**INFORMATION SERVICES:** Makes limited interlibrary loans; permits onsite reference by prior arrangement.

## PHILADELPHIA WATER DEPARTMENT

1931 1160 Municipal Services Bldg.  
John F. Kennedy Blvd. and 15th St.  
Philadelphia, Pa. 19107  
Tel: (215) 686-3801

**AREAS OF INTEREST:** Water supply for the City and suburban Bucks County, including treatment, pumping, storage, distribution, and metering; sanitary and industrial waste water disposal for the City, including collection, pumping, and treatment; waste water reception and treatment for neighboring communities; storm flood control throughout the City, including small creeks and waterways; industrial wastes control; studies of local river quality; design, construction, and management of all City water and waste water facilities; establishment of water and sewer service rates. The Department cooperates with the Delaware River Basin Commission on Delaware Bay water supply problems, including the control of pollution and salt water intrusions in the estuary of the Delaware River, and works with Federal Government agencies on problems of river water quality, volumes, and movements.

**PUBLICATIONS:** Annual reports, brochures, and pamphlets, all free on request.

**INFORMATION SERVICES:** Answers inquiries.

The Department maintains a Water Quality Control and Research Laboratory and various plant laboratories; a Research and Development Unit for special studies of water consumption, hydraulic and mathematical modeling, rainfall, and long-range river trends; a rain gage network; a stream gage network; sewer outfall instrument stations for flow and quality gaging; a network of electronic monitoring stations along the Delaware and Schuylkill Rivers for measuring and recording water quality; and a materials testing laboratory.

PHILADELPHIA ELECTRIC CO. LIBRARY

## PHILCO-FORD CORP.

### Western Development Laboratories Library

1932 3939 Fabian Way  
Palo Alto, Calif. 94303  
Tel: (415) 326-4350

**AREAS OF INTEREST:** Aeronautics; antennas; astronautics; astronomy-astronautics; calculus; communication; differential equations; dynamics; electric circuits; electromagnetics; electronics; geometry; mathematics analysis; physics; radar and radio; space sciences; information storage and retrieval.

**HOLDINGS:** 10,000 books; 800 bound journals; 10,000 reports; 40,000 reports in microform; maps, charts, microfiche, microfilm.

**PUBLICATIONS:** Bibliographies (for internal use).

**INFORMATION SERVICES:** Makes interlibrary loans; provides reference and literature-searching services.

## PHILIP MORRIS, INC. RESEARCH CENTER

1933 P.O. Box 3-D  
Richmond, Va. 23206

### Location:

4201 Commerce Rd.  
Richmond, Va.  
Tel: (703) 275-8361

**AREAS OF INTEREST:** Organic chemistry; physics; packaging; tobacco chemistry and technology and the composition and chemistry of cigarette smoke; applied research and development in subsidiary consumer products such as razor blades and chewing gum.

**HOLDINGS:** 5,000 books; 750 journals; 550 reels of microfilm; 200 microfiche; 32 vertical file drawers of pamphlets; photostats, reprints, patents, data.

**PUBLICATIONS:** Reports, indexes, bibliographies.

**INFORMATION SERVICES:** Answers inquiries; provides reference, duplication, and bibliographic services; makes interlibrary loans; permits onsite use of collection.

Facilities include IBM 870 and 1620 computers, Recordak Lodestar, 3M reader-printer, and Xerox microprinter.



PHILIP MORRIS, INC. RESEARCH CENTER

1938

## PHILIPS LABORATORIES

### Research Library

1934 Philips Laboratories  
Scarborough Rd.  
Briarcliff Manor, N.Y. 10510  
Tel: (914) 762-0300

AREAS OF INTEREST: Solid state physics and devices; 3-D imaging and display devices; cryogenics; photoemission; automatic analytic instrumentation; electronic engineering; chemistry.

HOLDINGS: 10,000 books; 450 journals; 6,000 reports; patent data.

INFORMATION SERVICES: Provides consulting services on fee or contract basis; provides reference services and lends materials for onsite or offsite use to Special Libraries Association members and to Government agencies and their contractors.

## PHILLIPS FIBERS CORP.

### Technical Information Department

1935 Phillips Fibers Corp.  
P.O. Box 66  
Greenville, S.C. 29602

#### Location:

I-85 at Ridge Rd.  
Greenville, S.C.  
Tel: (802) 242-6600

AREAS OF INTEREST: Manmade fiber; textiles; engineering; physics, chemistry.

HOLDINGS: 525 technical books; 650 technical reports; 60 periodicals; 300 standards and specifications; 800 engineering catalogs; 10 bibliographies; patents.

PUBLICATIONS: Technical publications on manmade fiber technology.

INFORMATION SERVICES: Answers inquiries; provides consulting, reference, literature-searching, abstracting, and translating services; lends materials.

## PHOTONUCLEAR DATA CENTER

see Commerce, Department of. National Bureau of Standards

## PILOTS INTERNATIONAL ASSOCIATION, INC.

1936 P.O. Box 907  
Minneapolis, Minn. 55402

#### Location:

2649 Park Ave.  
Minneapolis, Minn.  
Tel: (612) 335-3818

AREAS OF INTEREST: Flying safety; pilot proficiency; legislation affecting general aviation.

HOLDINGS: Film library; small collection of periodicals.

PUBLICATIONS: *PIA/Checkout in Plane & Pilot* magazine.

INFORMATION SERVICES: Answers inquiries; makes referrals. Services are free to members, Government agencies, and qualified nonprofit research organizations.

## PIPE FABRICATION INSTITUTE

1937 1326 Freeport Rd.  
Pittsburgh, Pa. 15238  
Tel: (412) 782-1624

AREAS OF INTEREST: Pipe fabrication for all pressures and temperatures; engineering; metallurgy.

HOLDINGS: Data.

PUBLICATIONS: Standards and specifications.

INFORMATION SERVICES: Answers inquiries; provides consulting services.

## PLASTIC COATING CORP.

### Research Center Library

1938 Plastic Coating Corp.  
Box 391  
Holyoke, Mass. 01040

#### Location:

Alvord St.  
South Hadley, Mass.  
Tel: (413) 536-7800

AREAS OF INTEREST: Reprography; photography; microfilm; organic chemistry, particularly diazo compounds; resin and polymer coating on paper and film.

1939

HOLDINGS: 1,500 books; 100 periodical titles.

INFORMATION SERVICES: Answers inquiries; provides reference, literature-searching, abstracting, and duplication services; makes interlibrary loans; permits onsite use of collection with special approval. Services are available to libraries, academic institutions, and customer corporations.

### PLASTICS TECHNICAL EVALUATION CENTER

see Army, Department of the. Army Materiel Command

### POLAROID CORP.

#### Technical Information Center

1939 Polaroid Corp.  
730 Main St.  
Cambridge, Mass. 02139  
Tel: (617) 864-6000 Ext. 3363

AREAS OF INTEREST: Photography; chemistry; physics; engineering; business.

HOLDINGS: 16,000 books; bound journals, photos, data; a specialized collection of articles on polarized light.

PUBLICATIONS: *Polaroid Library Bulletin* (approximately semimonthly).

INFORMATION SERVICES: Answers inquiries; makes interlibrary loans.

### THE POLYMER CORP. LIBRARY

1940 501 Crescent Ave.  
Reading, Pa. 19603  
Tel: (215) 929-5858 Ext. 248

AREAS OF INTEREST: Polymer science and technology; plastics processing, fabrication, and coatings.

HOLDINGS: 1,500 books; 200 periodical titles; 500 reports.

PUBLICATIONS: Annual list of periodical holdings (available for exchange with other special libraries).

INFORMATION SERVICES: Answers brief inquiries; provides limited duplication services; makes interlibrary loans.

Facilities include a photocopier suitable for magazines and books.

PLASTIC COATING CORP.

### POLYMER RESEARCH INSTITUTE

see University of Massachusetts

### POLYTECHNIC INSTITUTE OF BROOKLYN

#### Aerospace Research Laboratories

1941 Polytechnic Institute of Brooklyn  
Route 110  
Farmingdale, N.Y. 11735  
Tel: (516) 694-5500

AREAS OF INTEREST: Aerospace engineering; gas dynamics; heat transfer; fluid mechanics; solid mechanics; structural engineering; dynamics; shells (structural); plates (structural).

PUBLICATIONS: Reports, abstracts.

INFORMATION SERVICES: Answers inquiries; makes referrals.

Facilities include hypersonic and supersonic tunnels (Mach number in the inclusive range 1.5 to 12, total temperature in the inclusive range 530 to 3,000 degrees Fahrenheit, total pressure in the inclusive range 15 to 600 psia); a hypersonic shock tunnel (30,000 psi combustion driver, 6 ft.-diameter test section, Mach 8-20); and a rocket motor test stand, with capability for cryogenic handling and high frequency response instrumentation (one 10,000 lb. and one 800 lb. test stand).

#### Libraries

1942 Polytechnic Institute of Brooklyn  
333 Jay St.  
Brooklyn, N.Y. 11201  
Tel: (212) 643-4446 (Director of Libraries)  
(212) 643-8690 or 643-8691 (Reference Dept.)

AREAS OF INTEREST: Aeronautics; astronautics; aerodynamics; aircraft propulsion; aircraft structures; applied mechanics; biochemistry; bioengineering; chemical engineering; chemical physics; chemistry, including analytical, inorganic, organic, physical, and polymer; civil engineering; electrical communication; electrical engineering; electrical control; electrical power; electrophysics; elasticity; electrochemical engineering; history of science and technology; industrial management; mathematics; mathematical physics; mathematical statistics; mechanical design; mechanical engineering; metallurgy; physical metallurgy; metallography; metallurgical engineering; nuclear engineering; operations research and industrial engineering; petroleum engineering; physics; polymeric materials; system

#### POLYTECHNIC INSTITUTE OF BROOKLYN

science; transportation planning; soil mechanics and foundations; stress analysis; structural engineering; thermal engineering; X-ray crystallography; economics.

**HOLDINGS:** 150,000 volumes; 3,000 serial titles; 300,000 microforms; 15,000 technical reports; 20,000 documents; special collections in paints and surface coatings (The Mattiello Memorial Library) and in the history of science and technology. The Library is a depository for NASA and U.S. Superintendent of Documents publications.

**PUBLICATIONS:** *Stacks* (irregular, series of bibliographies and guides to information sources); *Quarterly Input* (list of new acquisitions); list of periodical holdings.

**INFORMATION SERVICES:** Answers inquiries; makes referrals; provides reference, bibliographic, and photoduplication services; makes interlibrary loans; permits onsite reference. Certain services to commercial and industrial users are on a fee basis. The Library is a participant in NASA/SCAN information service and Chemical Titles on Tape service.

#### PORCELAIN ENAMEL INSTITUTE

1943 1900 L St. NW.  
Washington, D.C. 20036  
**Tel:** (202) 296-0450

**AREAS OF INTEREST:** Porcelain enamel as applied to metal substrates, including steel, aluminum, and others; ceramic metal systems; porcelain enamel test methods, standards, and specifications; design and fabrication guides; processing information.

**HOLDINGS:** 300 books; 1,000 journals; 1,000 reports.

**PUBLICATIONS:** *Proceedings of the PEI Technical Forum* (annual); *PEI Newsletter* (monthly); *PEI Digest* (bimonthly).

**INFORMATION SERVICES:** Answers inquiries; makes referrals; provides reference, bibliographic, and duplication services for fee; permits onsite use of literature collection by qualified visitors.

#### PORT OF NEW YORK AUTHORITY

1944 111 Eighth Ave.  
New York, N.Y. 10011  
**Tel:** (212) 620-7000

**AREAS OF INTEREST:** Development and operation of transportation and terminal facilities in the New Jersey-New York Port District, including bridges, tunnels,

airports, marine terminals, bus and truck terminals, and an interstate rail rapid transit system; improvement and protection of commerce in the bi-State port area, including facilities for international trade such as The World Trade Center, now under construction.

**HOLDINGS:** 5,500 books; 900 periodical titles; 12,000 documents; indexes, bibliographies, publication lists, standards and specifications, microfilm.

**PUBLICATIONS:** *A Selected Bibliography of The Port of New York Authority* (biennial); *Port Authority Annual Report*; *Via Port of New York* (monthly).

**INFORMATION SERVICES:** Answers brief inquiries; makes referrals; provides bibliographic and literature-searching services; makes interlibrary loans; permits onsite use of collections.

#### PORTLAND CEMENT ASSOCIATION

1945 5420 Old Orchard Rd.  
Skokie, Ill. 60076  
**Tel:** (312) 583-6200

**AREAS OF INTEREST:** Cement and concrete chemistry; concrete projects pertaining to aggregates, products, ready-mix, reinforced, prestressed, precast, and masonry.

**HOLDINGS:** 2,000 photos and slides; books, journals, reports, reprints, bibliographies, pamphlets, clippings, films, data compilations.

**PUBLICATIONS:** Looseleaf technical reports, journals, state-of-the-art reviews, design data handbooks, recommended quality control practices, bibliographies.

**INFORMATION SERVICES:** Answers inquiries; makes referrals; permits onsite use of collection. The Association provides limited free distribution, within the United States and Canada, of its own publications.

#### POST OFFICE DEPARTMENT

##### Bureau of Research and Engineering

1946 U.S. Post Office Department  
12th St. and Pennsylvania Ave. NW.  
Washington, D.C. 20260  
**Tel:** (202) 961-8256

**AREAS OF INTEREST:** Application of modern technology in research, development, and engineering to the problems of mail handling operations in

1946

**1947**

the postal services; design, testing, and installation of mail processing machines and equipment, including address-coding and reading machines; improvements through industrial-engineering studies and analyses and implementation of new systems, techniques, and work methods.

**PUBLICATIONS:** Reports, brochures.

**INFORMATION SERVICES:** Responds to technical inquiries; provides research, development, and engineering services to other bureaus and offices of the Department, to industry and university research centers, to other Government agencies, and, in coordination with the Special Assistant for International Postal Affairs, to postal administrations of other countries.

### **Directives Management Branch**

**1947** Management Systems Division  
Office of Management Services  
U.S. Post Office Department  
12th St. and Pennsylvania Ave. NW.  
Washington, D.C. 20260  
Tel: (202) 961-7233 or 961-7665

**AREAS OF INTEREST:** Mail loss, theft, and damage; laboratory analysis of handwriting, typewriting, inks, poisoned foods, bomb parcels, etc.; mailability of materials determined to be obscene, subversive, or concerned with lotteries, and of threats, firearms, and extortion notes; mechanization of mail distribution and delivery; mail classification, rates, and fees; postal transportation economics, facilities, and schedules; data processing.

**PUBLICATIONS:** *Postal Bulletin* (weekly); *Postal Manual*; pamphlets.

**INFORMATION SERVICES:** Refers inquiries to specialists within the Post Office Department.

### **Post Office Department Library**

**1948** Post Office Department Bldg., Room 6012  
12th St. and Pennsylvania Ave. NW.  
Washington, D.C. 20260  
Tel: (202) 783-3100 Ext. 7525

**AREAS OF INTEREST:** Postal history; foreign postal administrations; management; transportation; finance; law; engineering; American history.

**HOLDINGS:** Approximately 170,000 items, including 880 periodical titles, a special collection of postal history materials, legislative files from the 71st Congress to date, reports, manuscripts, pamphlets, clippings, maps, photos, general and local postal

### **POST OFFICE DEPARTMENT**

histories, National Postal Employee Organizations periodicals, and Universal Postal Union studies.

**INFORMATION SERVICES:** Makes interlibrary loans; provides Department-wide reference, research, and bibliographic services; provides postal history reference services to education and research institutions and the general public; permits onsite reference.

### **Special Assistant to the Postmaster General for Public Information**

**1949** U.S. Post Office Department  
12th St. and Pennsylvania Ave. NW.  
Washington, D.C. 20260  
Tel: (202) 961-7500

**AREAS OF INTEREST:** Post Office administration regulations, laws, policies, operations, facilities, programs, and problems; philately; zip code numbers; postal transportation, finance, research and engineering, personnel, inspection, and law enforcement.

**PUBLICATIONS:** *Postal Manual*; reports, pamphlets.

**INFORMATION SERVICES:** Answers inquiries; makes referrals; provides consulting, reference, and document services. Fifteen regional offices perform similar services. Inquiries should be directed to the Assistant to the Director, Regional Office, U.S. Post Office Department, at the following addresses:

**Region: Florida, Georgia, North Carolina, South Carolina**  
John Hancock Bldg.  
230 Houston St. NE.  
Atlanta, Ga. 30304  
Tel: (404) 688-3517

**Region: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island**  
Post Office and Courthouse Bldg.  
Boston, Mass. 02109  
Tel: (617) 223-2100

**Region: Illinois, Michigan**  
Main Post Office Bldg.  
Chicago, Ill. 60699  
Tel: (312) 353-4400

**Region: Indiana, Kentucky, Ohio**  
P.O. Box 1999  
Cincinnati, Ohio 45201  
Tel: (513) 684-2200

**Region: Texas, Louisiana**  
Main Post Office Bldg.



**POST OFFICE DEPARTMENT**

Box 3

Dallas, Tex. 75221

Tel: (214) 748-5611

*Region: Arizona, Colorado, New Mexico, Utah, Wyoming*

P.O. Box 1979

Denver, Colo. 80201

Tel: (303) 297-4064

*Region: Alabama, Mississippi, Tennessee*

Post Office Bldg.

Memphis, Tenn. 38101

Tel: (901) 534-3011

*Region: Minnesota, North Dakota, South Dakota, Wisconsin*

Federal Bldg., Fort Snelling

Minneapolis, Minn. 55425

Tel: (612) 725-4242

*Region: New York, Puerto Rico, Virgin Islands*

Main Post Office Bldg.

New York, N.Y. 10098

Tel: (212) 736-7700

*Region: Pennsylvania, New Jersey, Delaware*

P.O. Box 8601

Philadelphia, Pa. 19103

Tel: (215) 597-9766

*Region: Arkansas, Iowa, Missouri*

1114 Market St.

St. Louis, Mo. 63199

Tel: (314) 622-8100

*Region: California, Hawaii, Nevada, all Pacific possessions*

631 Howard St.

San Francisco, Calif. 94106

Tel: (415) 556-4640

*Region: Alaska, Idaho, Montana, Oregon, Washington*

P.O. Box 9000

Seattle, Wash. 98109

Tel: (206) 583-4626

*Region: District of Columbia, Maryland, Virginia, West Virginia*

521 12th St. NW.

Washington, D.C. 20269

Tel: (202) 783-5100

*Region: Kansas, Nebraska, Oklahoma*

Main Post Office Bldg.

Wichita, Kans. 67225

Tel: (316) 267-6311

**1952**

**POWDER ACTUATED TOOL  
MANUFACTURERS INSTITUTE, INC.**

1950 c/o Mr. George P. Byrne, Jr., Executive  
Director  
331 Madison Ave.  
New York, N.Y. 10017  
Tel: (212) 661-2050

**AREAS OF INTEREST:** Powder actuated fastening tools, including safety in use, operation, and application.

**PUBLICATIONS:** Standards and specifications.

**INFORMATION SERVICES:** Answers inquiries; makes referrals. The Institute serves in an advisory capacity to U.S. Government, State, and municipal bodies, and to labor (construction trades) councils, large industries, and large contractors and constructors.

**POWER CRANE AND SHOVEL  
ASSOCIATION**

1951 111 East Wisconsin Ave., Suite 1700  
Milwaukee, Wis. 53202  
Tel: (414) 272-0943

Power Crane and Shovel Association is a bureau of the Construction Industry Manufacturers Association.

**AREAS OF INTEREST:** Power cranes, shovels, and excavators.

**PUBLICATIONS:** Technical bulletins and standards.

**INFORMATION SERVICES:** Answers inquiries; makes referrals.

**POWER INFORMATION CENTER**

see University City Science Institute

**POWER SAW MANUFACTURERS  
ASSOCIATION**

1952 734 15th St. NW., Room 400  
Washington, D.C. 20005  
Tel: (202) 737-6510

**AREAS OF INTEREST:** Gasoline-powered chain saws.

**HOLDINGS:** Reports, manuals, standards and specifications.

**PUBLICATIONS:** *Technical Manual of Recommended Practices; Safety Manual*

**INFORMATION SERVICES:** Makes referrals.

1953

## PPG INDUSTRIES, INC.

### General Office Library

1953 PPG Industries, Inc.  
One Gateway Center  
Pittsburgh, Pa. 15222  
Tel: (412) 434-3177 or 434-3178

**AREAS OF INTEREST:** Glass science and technology; chemical, coatings, resins, and plastics industries; business management and law as related to the glass and chemical industries.

**HOLDINGS:** 10,000 books; 300 journals; 6,000 pamphlets.

**INFORMATION SERVICES:** Makes interlibrary loans according to code; provides reference services by special arrangement.

### Glass Research Center Library

1954 PPG Industries, Inc.  
P.O. Box 11472  
Pittsburgh, Pa. 15238

**Location:**

Guys Run Rd.  
Harmarville, Pa.  
Tel: (412) 362-5100 Ext. 344

**AREAS OF INTEREST:** Science and technology of glass.

**HOLDINGS:** 15,000 books; 650 journal titles; 14,000 technical reports; 31,000 patents; 200 standards and specifications; 250 abstracts and indexes; 90 graphs and tables.

**PUBLICATIONS:** Accessions list (biweekly).

**INFORMATION SERVICES:** Answers inquiries; provides duplication services; makes referrals; makes interlibrary loans; permits onsite reference by appointment.

## PRATT INSTITUTE LIBRARY

### Science and Technology Department

1955 Pratt Institute Library  
215 Ryerson St.  
Brooklyn, N.Y. 11205  
Tel: (212) 622-2200 Ext. 276

**AREAS OF INTEREST:** Most major branches of the physical sciences and engineering, with emphasis on

PPG INDUSTRIES, INC.

subjects important in the curriculum, including mathematics, chemistry, physics, computer science, building science, food science, and chemical, electrical, mechanical, and industrial engineering. There is some material in the earth sciences, civil engineering, biochemistry, microbiology, industrial design, and packaging. The Circulation Department has books on astronomy, popular science, and the biological sciences.

**HOLDINGS:** 5,500 books; 4,000 periodical volumes; 240 periodical titles; technical reports from NASA; scientific and technical society journals, proceedings, and transactions (chiefly American); a small number of U.S. Government publications, chiefly from the Bureau of Standards, the Patent Office, and the Atomic Energy Commission.

**INFORMATION SERVICES:** Makes interlibrary loans; provides reference and duplication services; permits onsite reference.

## PRESSURE SENSITIVE TAPE COUNCIL

1956 1201 Waukegan  
Glenview, Ill. 60042  
Tel: (312) 724-7700

**AREAS OF INTEREST:** Pressure sensitive tape and its uses; cellophane, plastic, rubber, paper, and cloth tape products (excluding surgical and medical tapes).

**PUBLICATIONS:** *Tape Directory* (annual); *Test Methods* (standards); membership directory.

**INFORMATION SERVICES:** Answers brief inquiries; consults with code and specification writing agencies to establish test methods and standard nomenclature.

## PRESTRESSED CONCRETE INSTITUTE

1957 205 West Wacker Dr.  
Chicago, Ill. 60606  
Tel: (312) 346-4071

**AREAS OF INTEREST:** Architectural and engineering applications of prestressed concrete for beams, girders, columns, pilings, slabs, wall panels, high-power transmission poles, pipe supports, railroad ties, pavements, cylindrical storage tanks, public, industrial, and office buildings, parking and marine structures, and rail and highway bridges and overpasses.

## PRESTRESSED CONCRETE INSTITUTE

**HOLDINGS:** 100 books; 250 periodicals; 25 bibliographies; 2,000 slides; 200 photos; indexes, newsletters, standards and specifications, reprints, clippings.

**PUBLICATIONS:** *Journal of the Prestressed Concrete Institute* (bimonthly); *PCI Items* (monthly); *Fundamentals of Prestressed Concrete Design*; *Schools of Prestressed Concrete*; *Underwriters' Laboratories, Inc. Reports* on fire retardant specification and fire tests; *Bridge Bulletin* (bimonthly); *Prestressed Concrete Multi-Level Parking Structures*; *Prestressed Concrete for Long-Span Bridges*; handbooks, manuals. A publications price list is available.

**INFORMATION SERVICES:** Answers inquiries; makes referrals; permits onsite reference.

## PRINCETON UNIVERSITY

### Accelerator Library

1958 Princeton-Pennsylvania Accelerator  
Forrestal Research Center  
U.S. Highway No. 1  
Princeton, N.J. 08540  
Tel: (609) 452-3205

**AREAS OF INTEREST:** High-energy physics; particle physics; nuclear physics; radiation protection; particle accelerators.

**HOLDINGS:** 1,374 books; 400 bound periodicals; 15,000 reports.

**INFORMATION SERVICES:** Provides reference services; provides duplication services for fee; makes inter-library loans; permits onsite reference.

### Aeronautical Engineering Library

1959 Forrestal Research Center  
U.S. Highway No. 1  
Princeton, N.J. 08540  
Tel: (609) 921-8000 Ext. 222

**AREAS OF INTEREST:** Aeronautical engineering; astronautics; applied mathematics; applied physics; nuclear physics; physical chemistry; electronics; instrumentation; control systems; fluid mechanics.

**HOLDINGS:** 8,000 books; 4,000 bound periodicals; 35,000 unclassified and 35,000 classified reports; 30,000 unclassified and 10,000 classified microcard reports.

**PUBLICATIONS:** Accessions list (biweekly).

**INFORMATION SERVICES:** Provides reference services; provides duplication services for fee; makes inter-library loans; permits onsite reference.

1963

### Astronomy Library

1960 Princeton University Observatory  
Peyton Hall  
Princeton, N.J. 08540  
Tel: (609) 452-3820

**AREAS OF INTEREST:** Astronomy; astrophysics; space exploration; spectroscopy; plasma physics.

**HOLDINGS:** 9,000 books and bound periodicals; 1,945 cataloged reprints and pamphlets; a complete series of major astronomical journals.

**INFORMATION SERVICES:** Provides reference services; makes interlibrary loans; permits onsite reference; provides duplication services for fee.

### Chemistry Library

1961 Frick Chemical Laboratory  
Princeton University  
Princeton, N.J. 08540  
Tel: (609) 452-3238

**AREAS OF INTEREST:** Chemistry, including general, physical, organic, and inorganic; biochemistry.

**HOLDINGS:** 11,000 books; 13,000 bound periodicals; 1,000 departmental dissertations.

**INFORMATION SERVICES:** Provides reference services; provides duplication services for fee; makes inter-library loans; permits onsite reference.

### Engineering Library

1962 School of Engineering and Applied Science  
Princeton University  
Princeton, N.J. 08540  
Tel: (609) 452-3200

**AREAS OF INTEREST:** Civil, electrical, chemical, geological, nuclear, and mechanical engineering; physics; solid state physics; rheology; plastics; computers; engineering economics; electronics; mathematics.

**HOLDINGS:** 20,000 books; 25,000 bound periodicals; 10,000 cataloged pamphlets; dissertations; Stanford L. Wilson Memorial Collection of fluid dynamics and diffusion studies; 130,000 engineering research reports (microfiche and hard copy).

**INFORMATION SERVICES:** Provides reference services; provides duplication services for fee; makes inter-library loans; permits onsite reference.

### Geology Library

1963 Guyot Hall  
Princeton University  
Princeton, N.J. 08540